NOTE: When more than one set of minimums are published, use the lowest MDA to determine VDP location.

(c) Width. The beginning width (relative to RCL extended) of the visual area at its origin point 200 feet from RWT is ±200 feet for runways serving only Cat A/B aircraft, and ±400 feet for runways serving Cat C/D/E aircraft. The sides splay outward relative to RCL (see figure 14-6). Calculate the width of the area at any distance "d" from its origin using the following formula:

$$\tfrac{1}{2}W = (0.138 \times d) + k$$

Where ½W=Perpendicular distance in feet from centerline to edge of area

k=200 for Cat A/B, 400 for Cat C/D/E

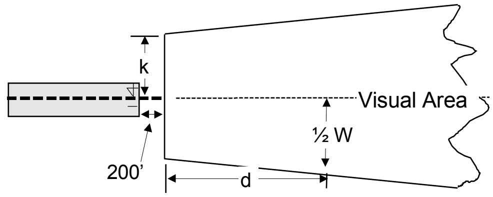

Figure 14-6 VISUAL AREA ORIGIN, Par 251a(2).

(3) Offset. When the final course does not coincide with the runway centerline extended (± 0.05°), modify the visual area as follows: (See figure 14-6A)

(a) STEP 1**.** Draw the area aligned with the runway centerline as described in paragraph 251a(2).

(b) STEP 2. Extend a line perpendicular to the final approach course (FAC) from the visual descent point (VDP) (even if one is not published) to the point it crosses the runway centerline (RCL) extended .

(c) STEP 3. Extend a line from this point perpendicular to the RCL to the outer edge of the visual area, noting the length (L) of this extension.

(d) STEP 4. Extend a line in the opposite direction than the line in Step 2 from the VDP perpendicular to the FAC for the distance (L).

(e) STEP 5. Connect the end of the line constructed in Step 4 to the end of the inner edge of the area origin line 200 feet from runway threshold.

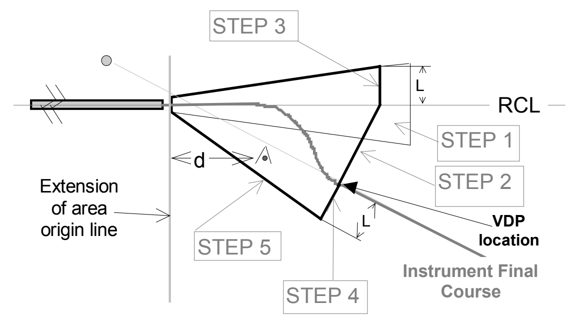

Figure 14-6A. VISUAL SEGMENT FOR OFFSET COURSE, Par 251a(3).

b. Obstacle Clearance. Two obstacle identification surfaces (OIS) overlie the visual area with slopes of 20:1 and 34:1, respectively. When evaluating a runway for circling, apply the 20:1 surface. When evaluating a runway for an approach procedure satisfying straight-in alignment criteria, apply the 20:1 and 34:1 surfaces. Calculate the surface height above threshold at any distance "d" from an extension of the area origin line using the following formulae:

$$20:1 \text{ Surface Height} = \frac{d}{20}$$

$$34:1 \text{ Surface Height} = \frac{d}{34}$$

(1) 34:1 Surface Penetrations. If the 34:1 surface is penetrated, take **ONE** of the following actions:

(a) Adjust the obstacle height below the surface or remove the penetrating obstacles.

(b) Limit minimum visibility to ¾ mile.

(2) 20:1 Surface Penetrations (straight-in runways). Take **ONE** of the following actions:

(a) Adjust the obstacle height below the surface or remove the penetrating obstacles.

(b) Do not publish a VDP**,** limit minimum visibility to 1 mile, and take action to have the penetrating obstacles marked and lighted.

(c) Do not publish a VDP**,** limit minimum visibility to 1 mile, and publish a note denying the approach (both straight-in and circling) to the affected runway at night.

(3) 20:1 Surface Penetrations (circling runways). Mark and light the penetrating obstacles or publish a note denying night circling to the affected runway.

(4) Obstacles that penetrate the 20:1 OIS MUST be marked and lighted in order to retain nighttime authorization for the approach. Penetrating obstacles are sometimes impossible to mark and light. In these cases ONLY, nighttime operations may continue where an operating VGSI set at an angle ≥3° serves the runway and its associated OCS is verified to be clear. The approach chart must be annotated to indicate the straight-in approach procedure or circling operation (as appropriate) is not authorized at night when the VGSI is inoperative.

252. DESCENT ANGLE / GRADIENT. The OPTIMUM nonprecision final segment descent gradient is 318 ft/NM which approximates a 3.00° angle. The MAXIMUM descent gradient is 400 ft/NM that approximates a descent angle of 3.77°. Calculate descent gradients from the plotted position of the FAF or stepdown fix to the plotted position of a stepdown fix or final endpoint (FEP) as appropriate (see figure 14-7). The FEP is formed by the intersection of the final approach course (FAC) and a line perpendicular to the FAC that extends through the runway threshold (first usable landing surface for circling only procedures). When the maximum descent gradient is exceeded, straight-in minimums are NOT authorized; however, circling only minimums may be authorized if the maximum circling descent gradient is not exceeded (see paragraph 252d). In these cases, publish the actual descent gradient to TCH rather than to CMDA.

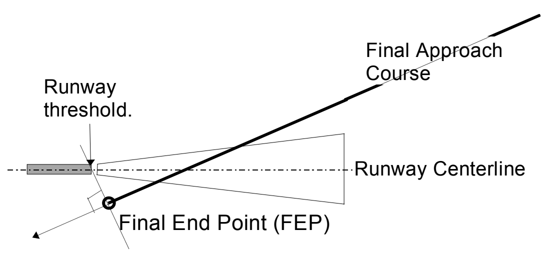

Figure 14-7. FINAL END POINT, Par 252.

a. Non-RNAV Approaches. FAF and/or last stepdown fix (SDF) location and altitude should be selected to provide a descent angle and TCH coincident (±0.20°, ± 3′) with the lowest published visual glide slope indicator (VGSI) glide slope angle, when feasible; or, when VGSI is not installed, the FAF and/or last SDF location and altitude should be selected so as to achieve a near optimum final segment descent gradient. To determine the FAF or SDF altitude necessary to align the descent angle with the lowest VGSI, calculate the altitude gain of a plane with the slope of the lowest published VGSI glide slope angle emanating from the lowest published VGSI threshold crossing height (TCH) to the FAF or SDF location. To determine the OPTIMUM FAF or SDF altitude, calculate the altitude gain of a 318 ft/NM gradient (3° angle) extending from the visual TCH (when there is not a VGSI, see table 18A) to the FAF or SDF location. Round this altitude up or down to the 100′ increment for the FAF or 20' increment for the SDF. Ensure that ROC requirements are not violated during the rounding process. If the gradient from TCH to SDF is greater than the gradient from TCH to FAF, continue the greater gradient to the FAF and adjust the FAF altitude accordingly. If ATC application of hold-in-lieu of PT criteria in paragraph 234e(1) or intermediate segment obstacles prohibit this altitude, consider relocating the FAF to achieve an altitude that will satisfy these requirements and the VGSI or optimum descent gradient (see figure 14-8).

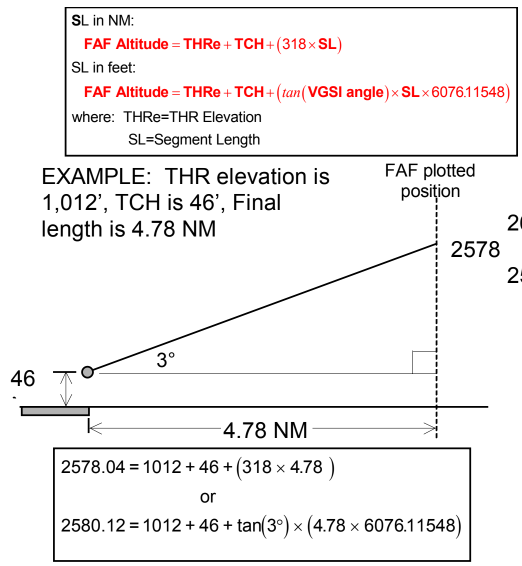

Figure 14-8. FAF ACTIVITIES GIVEN FINAL LENGTH, Par 252a.

b. RNAV Approaches. If feasible, place the FAF waypoint where the optimum descent angle, or the lowest published VGSI (if installed) glidepath angle intersects the intermediate altitude or the altitude determined by application hold-in-lieu of PT criteria in paragraph 234e(1). When an SDF is used, the SDF altitude should be at or below the published VGSI glide slope angle (lowest angle for multi-angle systems). See figure 14-9.

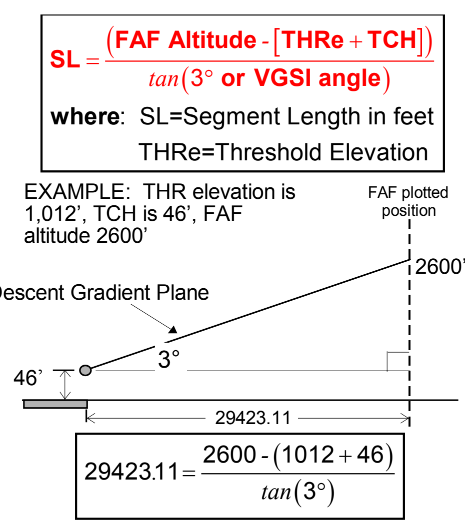

Figure 14-9. FINAL LENGTH GIVEN FAF ALTITUDE, Par 252